BUS 310: Business Analytics II

Section 004  Tues/Thurs  9:00 - 10:15 am  Robinson Hall-B203
Spring 2019 - Course Syllabus

Instructor:  Prof. Sid Das
Office:  154, Enterprise Hall
Phone:  (703) 993-1790
E-Mail:  sdas@gmu.edu
Course Website:  Blackboard
Office Hours:  10:30 – 11:30 a.m., Tues/Thurs, OR by appointment

Required Text:


- There are many options that exist for a used copy, e-book, or rental through a third party such as Amazon or through the publisher at [www.cengage.com](http://www.cengage.com)

Prerequisites:
1. BUS 210 or equivalent with a grade of C or better
2. Essential and expected knowledge: Proficiency in elementary algebra and geometry. Familiarity with recent versions of MS Word, PowerPoint, and Excel. Deficiencies in any of these areas should be self-remediated.

University Catalog Description:

This course introduces the concepts of modeling relationships contained in data and the use of linear models to make predictions in business. Topics include estimation, hypotheses testing, statistical inference, analysis of variance and linear regression techniques. The course also introduces students to fundamentals of linear programming to solve optimization problems in business.

Undergraduate program learning goals (those in **bold** will be addressed in this class):

1. **Our students will be competent in their discipline.**
2. **Our students will be aware of the uses of technology in business.**
3. **Our students will be effective communicators.**
4. **Our students will have an interdisciplinary perspective.**
5. Our students will be knowledgeable about global business and trade.
6. Our students will recognize the importance of ethical decisions.
7. Our students will be knowledgeable about the legal environment of business.
8. Our students will be knowledgeable about team dynamics and the characteristics of effective teams.
9. Our students will understand the value of diversity and the importance of managing diversity in the context of business.
10. **Our students will be critical thinkers.**
This syllabus is subject to change. Any changes to this syllabus will be formally announced in Blackboard

**Sequence Course Objectives for both BUS210 and BUS 310:**
- Understand how managers use business analytics to formulate and solve business problems
- Prepare to be a strategic business partner in an organization
- Think critically about whether and how data can improve business performance, create opportunities, and/or create risks

**Additional Specific Course Objectives for BUS 310**
- Understand the processes needed to analyze business data
- Make data driven decisions by using analytic tools such as estimation and hypothesis testing
- Gain skills to analyze business problems using more advanced functions in Excel
- Integrate statistics and management science to cover a variety of useful analytical methods
- Gain a basic understanding of linear optimization through an introduction to prescriptive analytics.

**Approach to Learning:**
This course examines the use of business analytics for understanding and analyzing business problems and for supporting business decision-making. It is geared for the business professional engaged in decision making or decision support. The emphasis is on business applications, and not mathematics. Students will possess an adequate level of proficiency in and comfort with spreadsheet software. The format will be lectures and hands-on exposure to data analytics tools, including complex Excel options. Discussions and questions are highly encouraged.

**Methods of Student Evaluation:**
Students will be evaluated based on exams, homework, assignments, and case studies.

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (3 major and some minor) and Excel assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Case Studies</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 1 and Exam 2 Average</td>
<td>50%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Homework:**
1. There are three homework assignments. Each homework will consist of a major homework and some minor homework(s).
2. It is in the best interest of the student to complete each and every homework assignment. Homework is for the student’s benefit; it is a diagnostic tool by which the student may assess their understanding and performance. Failure to do so will adversely affect performance, and will negatively impact exam and course grades.
3. Homework assignments will be posted on Blackboard.
4. Homework problems, both their assignment and solution, are the sole responsibility of the individual student.

**Excel Assignments:**
These will be assigned and graded. Due dates will be given in class.

**EXAMS:** Exam dates are provided in the schedule. No make-up exams will be given except in a Documented Emergency. The best possible preparation for them is regular attendance and completion of assigned homework, assignments, and reading.

Prof. Sid Das, BUS-310, Spring 2019
Computer/Software/Email:

Access to the internet and a computer is required. Many of the course material will be online in our Blackboard course. Communication will be via Blackboard and/or your GMU e-mail only. **I will only respond to GMU e-mails and will not respond to e-mails written on a private account.**

The latest version of Microsoft Excel will be used in this class. Microsoft Excel is available for download for GMU students. It is your responsibility to make sure your laptop meets the required standards. Refer to the School of Business laptop policy at [http://business.gmu.edu/media/com_managedlists/72/Laptop-Requirements-AY1718.pdf](http://business.gmu.edu/media/com_managedlists/72/Laptop-Requirements-AY1718.pdf)

You are required to bring a laptop with Microsoft Excel to class.

Course Grade

1. Students must be officially registered in this section to receive a grade. It is the sole responsibility of the student to verify their own registration status. (I will not verify your registration.) Specifically, you will not receive a grade if your name does not appear on the official class list. (Don't wait until the end of the semester to be surprised.) Registration problems should be directed to either the School of Business Academic Advisors or the Registrar’s Office.
2. Disputes about a grade on assignments/exams/quizzes must be submitted in writing within a week after the grade has been posted.
3. The final letter grade is assigned objectively and strictly according to the WEIGHTED average of the numerical scores of all exams, quizzes, and assignments.
4. Final course letter grade assignments:

<table>
<thead>
<tr>
<th>COURSE AVERAGE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>97.00 to 100</td>
<td>A+</td>
<td>80.00 to 82.99</td>
<td>B-</td>
</tr>
<tr>
<td>93.00 to 96.99</td>
<td>A</td>
<td>77.00 to 79.99</td>
<td>C+</td>
</tr>
<tr>
<td>90.00 to 92.99</td>
<td>A-</td>
<td>70.00 to 76.99</td>
<td>C</td>
</tr>
<tr>
<td>87.00 to 89.99</td>
<td>B+</td>
<td>60.00 to 69.99</td>
<td>D</td>
</tr>
<tr>
<td>83.00 to 86.99</td>
<td>B</td>
<td>0 to 59.99</td>
<td>F</td>
</tr>
</tbody>
</table>

When turning in ANY assignment, you should not copy another student's response or submit somebody else's work as your own. You are encouraged to work together. However, make sure all responses are written in your own words and that every file submitted is your own file created by you.

George Mason University takes violations of the Honor Code seriously. You should thoroughly read the last two pages of the syllabus to see the School of Business' sanctions for violations. There isn't a "slap on the wrist" or a "warning". The sanctions for a first offense are very serious even on homework.

Attendance:

Class attendance is essential part of learning for this course. If you have to miss any lectures, you are responsible for obtaining any information given in the class. **Attendance will be taken periodically.**

Disability:

All academic accommodations due to disability must be arranged through the Office of Disability Services (ODS). If you are a student with a disability and you require academic accommodations, please contact ODS at 703-993-2474. I will cooperate fully with the ODS to accommodate a student’s special needs.

**NOTE: THERE WILL BE NO CELL-PHONE USE IN CLASS. 1% POINT WILL BE DEDUCTED FROM THE STUDENT’S FINAL SCORE FOR EVERY TIME CELL-PHONE IS USED IN CLASS.**

Prof. Sid Das, BUS-310, Spring 2019
Course Topics:

1. Data Driven Decisions
   a. Measuring Response
      i. Sampling and Sampling Distributions
      ii. Estimation Theory
   b. Comparing Results
      i. Hypothesis Testing
   c. Data analysis and statistical functions in Excel

2. Introduction to Predictive Analytics
   a. Regression
   b. Inference within Regression
   c. Simple and Multiple Regression
   d. Data analysis and statistical functions in Excel

3. Introduction to Prescriptive Analytics
   a. Linear Optimization
   b. Model Development and Excel Solver

Case Studies:

Chapter 8 Case Problem: Employee Retention at D&Y
Chapter 9 Case Problem: Removing Vioxx from the Market
Chapter 10 Case Problem: Investing for Retirement
Chapter 11 Case Problem: Heating Oil at Dupree Fuels Company
Chapter 13 Case Problem: Shelby Shelving
<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>Readings/Exam Schedule</th>
<th>Homework/Case Studies</th>
</tr>
</thead>
</table>
| 1/22-1/24  | Course Orientation
Overview of Business Analytics
Random Sampling and Sampling Distributions | *Highlights of Sections 7.3-7.4*                                                      |                                                                                      |
| 1/29-1/31  | Interval Estimation                                                    | Chapter 8 Sections 8.1-8.3                                                              | Major Homework 1 assigned
Due on 2/21                                                                            |
| 2/5-2/7    | Interval Estimation (Continued)                                        | Chapter 8 cont. Sections 8.5,8.7,8.9                                                   | Case: Employee Retention at D&Y (p. 361); Due on 2/12
Professor will announce what is to be done with case studies
Due on 3/06                                                                            |
| 2/12-2/14  | Hypothesis Testing                                                     | Chapter 9 Sections 9.1-9.3                                                              |                                                                                      |
| 2/19-2/21  | Hypothesis Testing                                                     | Chapter 9 Sections 9.1-9.3                                                              |                                                                                      |
| 2/26       | **EXAM - 1**                                                          | **Exam 1 covers all material studied until now.**                                      |                                                                                      |
| 2/28       | Hypothesis Testing (Continued)
Comparisons Involving Means                                              | Chapter 9 cont. Section 9.4b                                                            | Excel Assignment 1
Due on 3/05                                                                            |
| 3/5        | Hypothesis Testing (Continued)
Comparing Population Proportions                                         | Chapter 9 cont. Section 9.4d                                                            | Case: Removing Vioxx from the Market (pp. 412-413); Due on 3/07                      |
| 3/7        | Hypothesis Testing (Continued)
Comparing Population Variances                                              | Chapter 9 cont. Section 9.4c                                                            | Excel Assignment 2
Major Homework 2 assigned
Due on 3/28                                                                            |
| 3/11-3/17  | Spring Break (May 11- May 17)                                          |                                                                                       |                                                                                      |
| 3/19       | Hypothesis Testing (Continued)
Test for Independence                                                        | Chapter 9 cont. Section 9.6                                                             | Excel Assignment 3                                                                 |
| 3/21       | Analysis of Variance (ANOVA)                                           | Chapter 19 Sections 19.1-19.2                                                           | Excel Assignment 4                                                                 |
| 3/26-3/28  | Correlation and Simple Linear Regression                                | Chapter 10 Sections 10.1-10.4                                                          |                                                                                      |
| 4/2        | **EXAM - 2**                                                          | **Exam 2 covers all material studied after Exam 1**                                    |                                                                                      |
| 4/4        | Multiple Regression                                                    | Chapter 10 cont. Sections 10.5-10.6                                                    | Case: Investing for Retirement (p. 481); Due on 4/09                                 |
| 4/9-4/11   | Regression Analysis:
Statistical Inference                                                             | Chapter 11 Sections 11.1-11.3,11.5                                                     | Major Homework 3 assigned
Due on 5/2
Case: Heating Oil at Dupree Fuels Company (p. 536) Due on 4/18                        |
| 4/18       | Optimization Modeling and Linear Programming                            | Chapter 13 Sections 13.1-13.3                                                          | Excel Assignment 5                                                                 |
| 4/23-4/25  | Linear Programming (Continued)                                          | Chapter 13 cont. Section 13.3                                                          | Case: Shelby Shelving (pp. 659-660); Due on 4/30                                      |
| 4/30-5/2   | Linear Programming (Continued)                                          | Chapter 13 cont. Sections 13.4a,13.6                                                   |                                                                                      |
| 5/9        | **FINAL EXAM – MAY 9 (7:30 am – 10:15 am)**                           |                                                                                       |                                                                                      |
### School of Business Recommendations for Honor Code Violations

**Approved May 2016**

#### UG-Freshman Students

<table>
<thead>
<tr>
<th>Type of Violation</th>
<th>First Offense</th>
<th>Second Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plagiarism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Failure to cite/attribute sources</td>
<td>A 10% reduction in the final course grade; referral to the Writing Center; and Academic Integrity Seminar completion</td>
<td>An F in the class; referral to the Writing Center; and Academic Integrity Seminar completion</td>
</tr>
<tr>
<td>2. Representing someone else’s work as the student’s own (e.g., copying and pasting)</td>
<td>An F in the class; referral to the Writing Center; and Academic Integrity Seminar completion</td>
<td>An F in the class; referral to the Writing Center; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension or expulsion</td>
</tr>
<tr>
<td><strong>Cheating</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. On a minor assignment (e.g., homework, quizzes)</td>
<td>A 10% reduction in the final course grade; and Academic Integrity Seminar completion</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
</tr>
<tr>
<td>2. Cheating on a major assignment or exam, submitting course work from another course as original work</td>
<td>An F in the class; and Academic Integrity Seminar completion</td>
<td></td>
</tr>
<tr>
<td><strong>Lying</strong> (e.g., providing fraudulent excuse documents, falsifying data)</td>
<td>An F in the class; and Academic Integrity Seminar completion</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
</tr>
<tr>
<td><strong>Egregious Violation</strong> (e.g., stealing an exam; submitting coursework from another class as original work across multiple courses; lying to an employer about academic performance, false identification or posing as another, in person or online)</td>
<td>An F in the Class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
<td>An F in the Class; Academic Integrity Seminar completion; termination from the School of Business; and expulsion</td>
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</tbody>
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Note: The Academic Integrity Seminar used by Office of Academic Integrity costs $100.
## School of Business Recommendations for Honor Code Violations

**Approved May 2016**

### UG-Non Freshman Students (including transfer students)

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<td>An F in the class; referral to Writing Center; and Academic Integrity Seminar completion</td>
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<tr>
<td><strong>Cheating</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. On a minor assignment (e.g., homework, quizzes)</td>
<td>An F in the class; and Academic Integrity Seminar completion</td>
<td>An F in the class, Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension or expulsion</td>
</tr>
<tr>
<td>2. Cheating on a major assignment or exam, submitting course work from another course as original work</td>
<td>An F in the class; and Academic Integrity Seminar completion, and at least one semester suspension</td>
<td></td>
</tr>
<tr>
<td><strong>Lying</strong> (e.g., providing fraudulent excuse documents, falsifying data)</td>
<td>An F in the class; and Academic Integrity Seminar completion, and at least one semester suspension</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension or expulsion</td>
</tr>
<tr>
<td><strong>Egregious Violation</strong> (e.g., stealing an exam; submitting coursework from another class as original work across multiple courses; lying to an employer about academic performance, false identification or posing as another, in person or online)</td>
<td>An F in the class, Academic Integrity Seminar completion; termination from the School of Business; and at least one year suspension</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and expulsion</td>
</tr>
</tbody>
</table>